

N.B.S.

Summary of Progress from July 1 to October 1, 1965

NASA Contract R-09-022-039

Since this contract is to assist in partial support of an over-all program in cooperation with several government agencies, this report will briefly summarize the entire program activities and status. Special emphasis will be discussed in more detail where interest has been suggested.

OVER-ALL PROGRAM AREA

Collaboration with government agencies and other eligible activities in exploring feasible extensions of information technology and implementing prototype information systems that extend the frontiers of both systems design and emerging technology, with primary emphasis on matching existing needs with proposed techniques. Example of such experiments are studies of man-machine interactions in information processing systems.

Research and development in selected areas of computer sciences and related disciplines in order to explore the prospects for better methods, tools, and techniques.

PROJECT STATUS

During this period the operating time of the two NORBIC computers was divided almost equally between engineering and programming. Major engineering time was spent modifying the main frame interrupt system. Major modification of the I/O converters and device select units was completed. The primary purpose was to organize and redistribute the DSU's for interfacing teletype and display peripheral devices. Modification was also made in the address device decoders of the processor which was to be designated the executive machine.

Only a small amount of machine down-time was experienced with both machines. Machines were shut down for a short time to clean and up-date the power supplies. Only other machine failure was random memory access errors in processor two, which called for minor adjustment of core memory currents. Four segments of the core memory in processor one were lost simultaneously. It was found that the associated x-y coordinate driver transistors of these segments had been shorted. (No cause has been discovered for this incident.) Since these were replaced we have had excellent machine performance.

FACILITY FORM 602

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The first teletype interface unit was connected to the system and checked out. After this unit was used for approximately two months and detailed modifications were made and performance was checked, two more units were constructed. These two units have now been placed onto the system and the prototype removed. An additional interface was checked out and is now being installed on the system interconnecting the MAGIC display unit to the main frame. Operation tests will begin about October 1.

During this quarter, work was started on adapting an existing MORINIC teletype interface system utilizing discrete component modules to integrated circuits. DTL (Diode Transistor Logic) circuits were chosen because they most closely resemble that of the existing system. They are available from at least five manufacturers; have noise tolerances as good or better than other available types; and have the greatest variety of types of circuits available.

Primary emphasis was placed on software development during this quarter. As mentioned in a previous report, the time-shared system was carefully planned and the implementing procedure carefully detailed to quickly initiate a partial operating system. In order to accomplish the bootstrapping technique that was mentioned previously, a MESSAGING software system was prepared. This series of programs was developed to offer a simple but effective machine language allowing ease in program debugging. These programs also utilized the remote teletype allowing for hardware test of teletype interface. This system was completed and has been used effectively in debugging much of our CORB time-sharing system.

The CORB time-sharing system was carefully designed to be modular and was oriented to the manipulation and handling of file data. This was chosen because in the area of information retrieval, programming, display, etc., manipulation of files is the predominant function. For this reason system functions such as FILE, ASSEMB, KILL, MOVE, LIST, etc., were planned. Associated with any large system such as this, the fundamental log-in requirements, error detection, message generation, and other features designed to enhance user performance was pursued.

Fundamental interrupt methods were examined; two types of interrupt are being utilized in the present system. The Remote Station causes an interrupt when communicating with the main frame. However, the real-time clock within the main frame is used to initiate communications from the main frame to the proper remote device. This type of interrupt allows for different communication speeds for external devices which are time-controlled and does help to simplify the software. It also allows for experimentation with different communication speeds to the remote devices.

Attached is a list of system software status. A more detailed report will be prepared within the next two quarters.

Programs for MAGIC I were prepared for graphing functions and testing light pen operation as opposed to pushbuttons. During this period additional modifications were made to MAGIC I hardware to increase the instruction repertoire and communication capabilities with the main frames of MATHIC.

A final report on MAGIC I was submitted to the Fall Joint Computer Conference and accepted. This report will be published in the Conference Proceedings this coming December. A draft of this report is attached.

As stated previously, a dual-deflection display tube (magnetic and electrostatic) was loaned to us by NASA (Goddard). This display sub-system has been powered up and temporarily connected to a small core buffer and digital-to-analog converter. Also a new line generator has been designed and installed. Experiments will continue on this sub-system for circuit performance.

Construction of MAGIC II has not been initiated. Although there appears to be sufficient verbal commitments, funds are not yet in the house.

Software Status

COMPLETE

- I. DES system operational
- II. CMD
 1. System command input-command and format detected for all commands.
 2. Use of "++" and "/".
 3. Error messages.
 4. Assign command--including magnetic tape.
 5. Kill command--including magnetic tape.
 6. Complete interrupt for four teletypes and control for all system commands.

UNDER FINAL DEVELOPMENT

- I. Log-in sequence
- II. Quit command
- III. Move command TT → MT
 MT → TT
- IV. List command

PLANS PARTIALLY COMPLETED

- I. User processor supervisor
- II. Inter-processor communication
- III. Time-sharing control in executive
- IV. MAGIC control in t-s mode
- V. Scanner control in t-s mode